

Fiberoptic Colonoscopy: A Dramatic Advance in Colon Surgery

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SUMMARY

A new instrument is now available which will allow direct viewing of the lumen of the entire colon from rectum to cecum. Biopsies as well as excision of some lesions are also possible through the instrument. The advantages to the patient are many and obvious.

HOW MANY TIMES in your practice have you wished you could extend the sigmoidoscope to obtain a direct look at a lesion higher up in the colon? How often would a biopsy have helped, or, if only you could reach a pedunculated polyp with this extended sigmoidoscope, how often could the patient have been saved an abdominal operation by snaring off the polyp through the scope? All this is now not only possible, but quite practical.

The instrument designed for this purpose is called a fiberoptic colonoscope; it is somewhat similar to the gastroscope. The Olympus CF-LB model which we have used is quite flexible, has a working length of six feet, and controls at its head which will flex the tip in all directions through an arc of 240°. The width of the visual field is 60°, the observation range is two to five cm, and the lesion is magnified three times. Photographs may be easily taken with the accompanying camera since this is automatically synchronized and the exposure is also automatic. Movies may be taken as well.

At the distal end of the colonoscope there is the objective lens and two light portals, an opening for aspiration and forceps or snare, and another for insufflation of air or fluid. Air or fluid can be directed right over the

objective lens to help keep it clean. The short arm of the instrument is attached to the light source.

Method of Examination

Our patients are prepared for examination on a fluid diet beginning with lunch the previous day. Forty-five cc of phospho soda fleet (Frosst) are taken orally at seven the evening before the procedure and then again at seven on the morning of the examination. Then warm water enemas are given to clear. Twenty mg of buscopan are given intramuscularly 30 minutes before, and demerol and valium administered intravenously at the beginning of the procedure. This examination must be performed in the hospital and under fluoroscopic control (image intensifier). The colonoscope is inserted into the anal canal with the help of a bivalve anoscope, and the instrument is then gradually advanced with great care (fig. 1).

There are many "tricks" to this procedure. First there should always be direct visualization of the lumen as the instrument is advanced. The image intensifier helps greatly in navigating the difficult areas of the colon — the sigmoid colon, the flexures and a redundant transverse colon. As soon as the sigmoid colon is reached, place the patient prone. Different positioning may be required to advance the colonoscope into the cecum. The scope is then slowly withdrawn and any lesions are photographed and biopsied; a pedunculated polyp may be snared but this should be done only with great caution and expertise. It may also be helpful to record the location of the tip of the scope — when positioned at a lesion — on X-ray film; this may be important since the insufflation of air may greatly distort the colon. Patients withstand the procedure very well.

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It is obviously a great advance to be able to visualize a lesion *directly* through the colonoscope compared to the study of its shadows *indirectly* on the X-ray. The colonoscope is a valuable aid in making a more specific diagnosis of a lesion seen on X-ray, but even more so when a lesion seen on X-ray might be an artefact. A biopsy of this lesion will often help not only in the diagnosis but also in the grading of the tumor. Further lesions not seen on X-ray may also be discovered in the rest of the colon.

Indications for Colonoscopy

Whenever rectal polyps are seen on sigmoidoscopy, it is much more likely that polyps will be found in the colon either by X-ray or colonoscopy. Then, if the lesion seen on X-ray turns out to be pedunculated when seen through the colonoscope, it may be removed with the snare coagulation through this instrument, thereby avoiding the need for a laparotomy. This technique is of course most helpful when the operative risk is great.

Here are four cases which amply demonstrate the value of the colonoscope:

Mr. C. is a 65-year-old man referred to us with an X-ray diagnosis (Fig. 8) of a polyp in the descending colon, 2.5 cm in its greatest dimension. We noted several defects in the right colon. This patient had just had a vagotomy and gastroenterostomy a few months before, and did not wish to have another laparotomy.

A sigmoidoscopy to 25 cm revealed three rectal polyps which were all removed with our electrocoagulation snare instrument through the sigmoidoscope in our clinic. The polyp in question was, of course, out of reach of the sigmoidoscope.

The colonoscope passed quite readily all the way through the colon into the cecum (Fig. 6); a small polyp, which was of no consequence, was found in the ascending colon, and another at 90 cm in the proximal transverse colon. The polyp discovered on X-ray was seen at 45 cm; it appeared quite benign and had a very long, narrow stalk. It was biopsied (Fig. 7) and the pathology report was "benign adenomatous polyp". Of course, we still cannot be certain that the entire tumor is benign, but this polyp will be removed with the snare quite easily, thus avoiding a second abdominal procedure.

Mr. R. is a 70-year-old man who had a coronary, prostatectomy, hernia repair and renal lithiasis. He also had hypertension and some angina. He was referred to our clinic for hemorrhoidectomy ligation, and during this treatment a routine sigmoidoscopy revealed a polyp at 12 cm and others at 18 cm and 22 cm, all of which were removed with electrocoagulation in the office. A routine barium enema then showed two smaller polyps at the iliac crest, and one larger polyp in the mid-descending colon (Fig. 9). Since he was a poor surgical risk colonoscopy was performed, and again the colonoscope passed into the cecum with little difficulty (Fig. 10). However, not only were the polyps found that were described on the X-ray, but we found numerous other polyps in the ascending colon, the hepatic flexure region and the descending colon as well. These were all small, seemingly benign polyps and were photographed (Fig. 4). However, the one polyp in the mid-descending colon had a rather firm, slightly shaggy appearance and was larger than the others (Fig. 5), so for these reasons and because it was mostly sessile, we did a laparotomy and

polypectomy, excising the polyp along with a wide cuff of mucosa. The polyp had a very hard feel to it and the pathology report was "a well differentiated adenocarcinoma of large bowel, probably arising in a pre-existing adenomatous polyp". This treatment was therefore adequate, the operative time was greatly lessened, and colonoscopy discovered a suspicious lesion which later proved to be carcinoma.

Mrs. E. is a 74-year-old, short, obese German lady complaining of bright red rectal bleeding on the outside of the stool and a burning on the left side of the rectum, for the previous two months. She had a "pelvic carcinoma" removed two years ago in Germany; a sigmoidoscopy eight months ago and a gynecological examination six weeks ago were evidently normal.

Sigmoidoscopy revealed a crusted black friable and bloody lesion at 12 cm with associated petechial hemorrhages on the anterior wall (she had had radiation post-operatively in Germany). Biopsy through the sigmoidoscope was inadequate and inconclusive because the lesion was located just around a fixed bend of the rectum.

Barium enema showed a narrowing of the sigmoid colon at 25 cm from the anal verge over a length of about four cm (Fig. 3). This filling defect suggested an intramural lesion of the sigmoid colon with a possible deep ulcer and a probable second neoplasm at 25 cm. Thus, both these lesions required our further investigation to arrive at a firm diagnosis for each.

We performed a colonoscopy, and with proper angulation of the tip of the scope anteriorly towards the ulcer, excellent biopsy material was taken and then made a definite diagnosis of frankly infiltrating adenocarcinoma.

The colonoscope was inserted past the 25 cm mark — described as a probable second carcinoma by the radiologist — but this area was found to be perfectly normal.

A very low anterior resection was performed on this obese lady, with excellent results. The lesion described by the radiologist at 25 cm, we found to be due to postoperative adhesions which put traction on that portion of the colon, tenting out the mucosa to produce the ulcer described on the X-rays. The tumor at 12 cm was completely excised (Fig. 2) and no further spread was found.

Mr. D. is a 27-year-old man who was referred to us after two barium enemas done on separate occasions two months previously, and which showed an ovoid lesion in mid-sigmoid colon on each occasion.

The X-ray was repeated here and the polyp found at the same location as on the previous two films, but it had enlarged from four to six cm (Fig. 11); it was at 30 cm from the anal verge and beyond the reach of the sigmoidoscope.

Since the lesion had now been demonstrated on X-ray on three separate occasions in the same location of the sigmoid colon, and as it had obviously enlarged, laparotomy seemed inevitable and we therefore thought that colonoscopy was not indicated. This presumption turned out to be wrong.

At laparotomy, a very precise and careful palpation of the entire colon revealed no mass at all, let alone one six cm long. The pre-operative preparation had obviously cleaned away a large bolus. It is unfortunate that colonoscopy was not performed in this case instead of relying solely on the

three separate barium enema studies, since the patient would have been saved a laparotomy.

We have presented four cases which demonstrate the value of the colonoscope in determining the best treatment for the patient. In the first case the barium enema revealed a large polyp in the left colon and several possible defects in the right colon. The colonoscope showed polyps in the right colon but these were small and appeared to be benign. The large polyp in the descending colon also appeared benign and a small biopsy confirmed this in the area biopsied. However, the greatest benefit derived from the examination was the discovery of a long stalk on the large polyp in the descending colon, since this polyp can now be removed through the colonoscope. This procedure then saved him a second abdominal operation. However, only after it is totally removed will we be completely sure there is no malignancy in it.

In the second case the operative risk was great and X-rays showed several polyps. Colonoscopy enabled us to get a good look at these polyps and pick out the only one which looked suspicious. Thus we discovered an early malignant polyp, did a much smaller operative procedure and saved valuable operating time for this patient. His other polyps can be followed and treated through the colonoscope.

In the third case, a colonoscopy enabled us to get

around a fixed bend in the rectum and obtain a positive biopsy diagnosis of malignancy (in a rectum which had been previous radiated). We were also able to rule out the possible second neoplasm suggested on X-ray. The operation on this elderly patient therefore proceeded under much more favorable circumstances.

In the last case, we operated on this patient because of a large growing lesion seen in three separate barium enema studies. Although we would probably do the same thing again, colonoscopy would have easily shown that the X-ray diagnosis was wrong.

In two of the cases reported rectal polyps were seen and removed through the sigmoidoscope. Whenever rectal polyps are present, it is more likely that polyps will be found in the colon. The more polyps that are present the greater the chance of a malignancy, and the greater the indication for colonoscopy.

The fiberoptic colonoscope is a highly sophisticated, complicated and expensive piece of equipment (about \$7,000). It must be used with caution and skill. When used properly, it usually allows us (a) to view an intraluminal colon lesion directly, (b) to make a diagnosis when it is in doubt on the X-ray, (c) to take a biopsy of a colon lesion, and (d) to remove some lesions through the colonoscope, so avoiding abdominal surgery. In my opinion fiberoptic colonoscopy is a dramatic advance in colon surgery. ◀

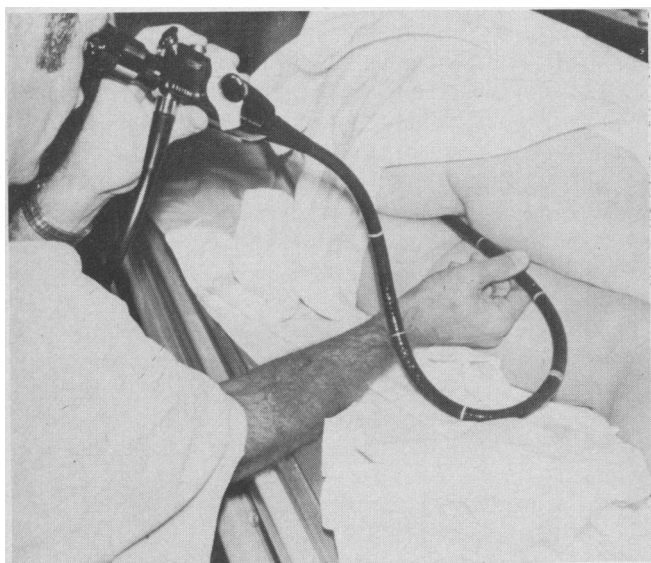


Fig. 1. Advancing the colonoscope.

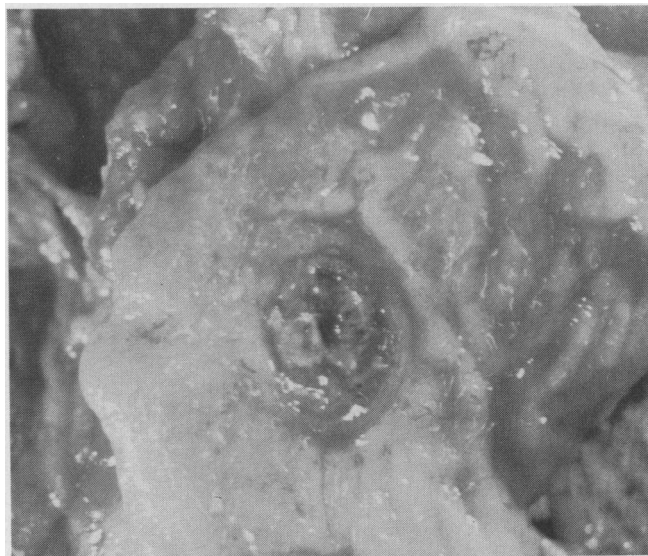


Fig. 2. Circumscribed malignant lesion.

Fig. 3. Arrow points to possible cancer. Colonoscopy showed lesion on right to be artefact.

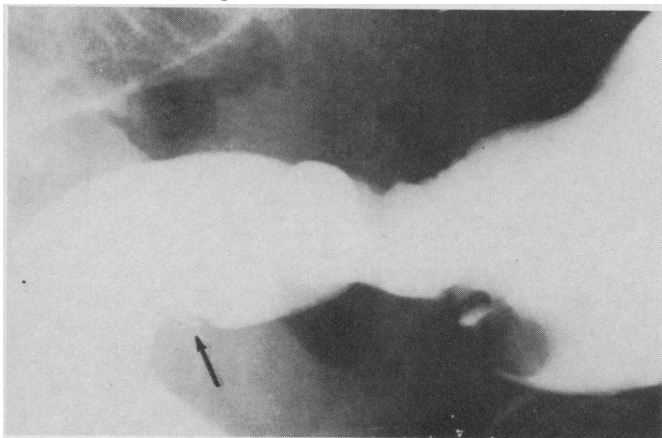


Fig. 4. Small pedunculated polyp may be removed through the scope. Black dots represent broken fiber-optic bundles, a quite normal occurrence.



Fig. 5. Malignant polyp.

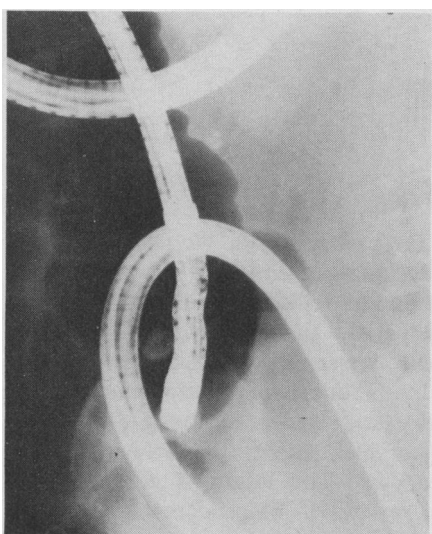


Fig. 6. The bottom loop shows the colonoscope in the sigmoid colon. The upper curve is part of the transverse colon. The tip is in the cecum.

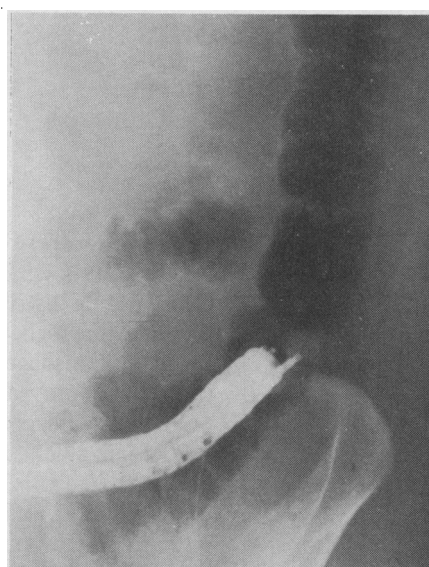


Fig. 7. Tip of the biopsy forceps protruding beyond the scope taking a biopsy of the tumor.

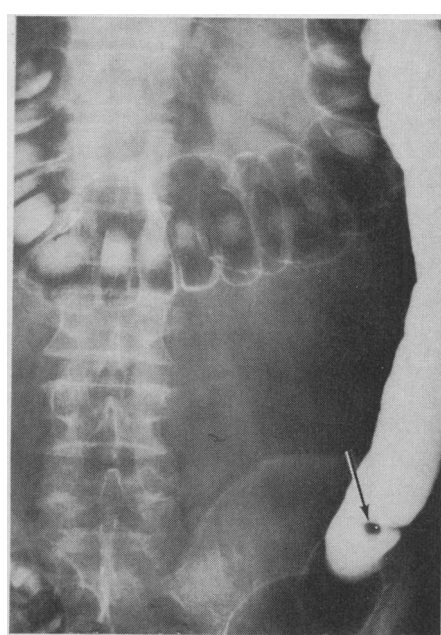


Fig. 8. Polyp in descending colon.

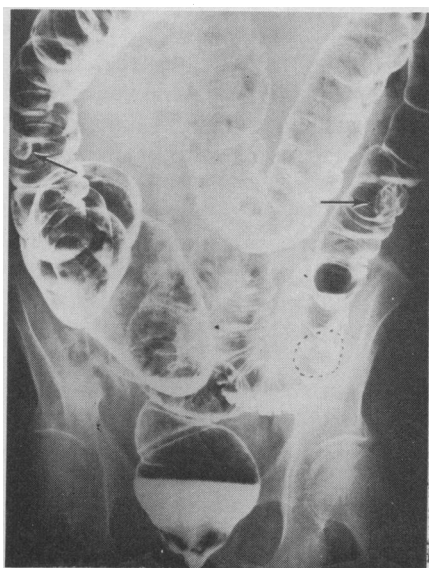


Fig. 9. Multiple polyps of the colon.

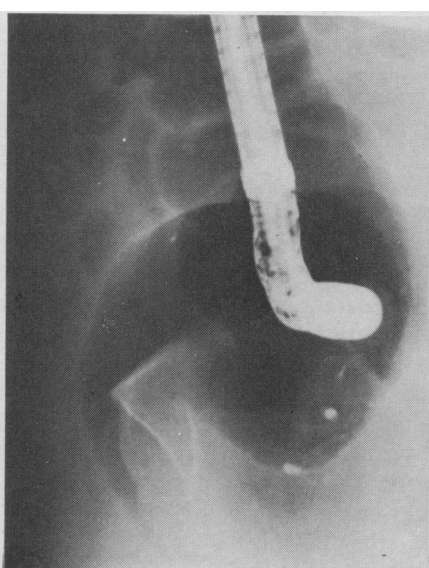


Fig. 10. Tip of colonoscope in the cecum looking at the ileo-cecal valve.

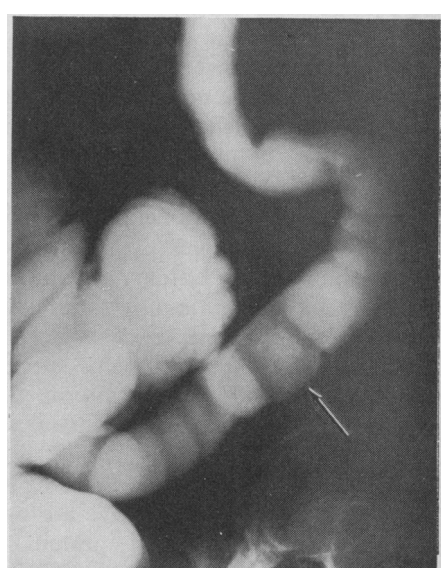


Fig. 11. Arrow points to lesion.